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NOTICE OF ALLOWANCE AND FEE(S) DUE

23494 7590 04/23/2009

TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER	
PHU, PHUONG M	
ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 04/23/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,654	12/31/2003	Robert B. Staszewski	TI-35744	1713

TITLE OF INVENTION: PREDISTORTION CALIBRATION IN A TRANSCEIVER ASSEMBLY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	07/23/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

23494 7590 04/23/2009

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,654	12/31/2003	Robert B. Staszewski	TI-35744	1713

TITLE OF INVENTION: PREDISTORTION CALIBRATION IN A TRANSCEIVER ASSEMBLY

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	$1510	$300	$0	$1810	07/23/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
PHU, PHUONG M	2611	375-296000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 622 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 622 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/749,654	STASZEWSKI ET AL.	
	Examiner	Art Unit	
	Phuong Phu	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *the Amendment filed on 04/14/09*.

2. ☒ The allowed claim(s) is/are *2-11,16,19,20 and 22-31*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Phuong Phu/
Primary Examiner, Art Unit 2611

DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on 04/14/09. Accordingly, claims 2-11, 16, 19, 20 and 22-31 are currently pending; and claims 1, 12-15, 17, 18, 21 and 32 are canceled.

REASONS FOR ALLOWANCE

2. Claims 2-11, 16, 19, 20 and 22-31 are allowed.

3. The following is an examiner's statement of reasons for allowance:

-Regarding independent claim 2, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier and a gain normalization component that transfers the digital input from a normalized domain to a domain that is dependent on process, voltage, and temperature (PVT) variations; and a signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal.

-Regarding independent claim 4, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier that is integrated into the integrated transceiver circuit, the power amplifier accepting digital RF input; and a signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal.

-Regarding independent claim 16, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier that is external to the integrated transceiver circuit, an amplitude modulated path that controls the supply to the external amplifier according to a first digital input, and a phase modulated path comprising a gain normalization component that adjusts a second digital input for process, voltage, and temperature (PVT) variations associated with the digitally controlled oscillator, that provides a radio frequency input to the external power amplifier according to the second digital input; and a signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal.

-Regarding independent claim 19, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier that is external to the integrated transceiver circuit, an amplitude modulated path comprising a gain normalization component that adjusts a second digital input for process, voltage, and temperature (PVT) variations associated with the digitally controlled oscillator, a digital transmit path comprising an amplitude modulate path that controls the supply to an external amplifier according to a second digital input, and a phase modulated path that provides a radio frequency input to the external power amplifier according to the second digital input; and a

signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal.

-Regarding independent claim 20, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier and being operative to alternate between a saturation mode, in which the power amplifier is driven at saturation, and a linear mode, in which the power amplifier operates within a linear range; and a signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal.

-Regarding independent claim 22, none of prior art of record teaches or suggests a method of calibrating a predistortion component in a transceiver system, comprising: providing a first digital signal, containing amplitude information related to a desired analog signal, to a transmitter path; providing a second digital signal, containing phase information related to the desired analog signal, to the transmitter path; predistorting at least one of the first digital signal and the second, digital signal in the digital domain according to at least one predistortion parameter; and converting the first digital signal and the second digital signal from associated normalized domains to process, voltage, and temperature (pvT) dependent domains.

-Regarding independent claim 23, none of prior art of record teaches or suggests a method of calibrating a predistortion component in a transceiver system, comprising: providing a first digital signal, containing amplitude information related to a desired analog signal, to a transmitter path; providing a second digital signal, containing phase information related to the

desired analog signal, to the transmitter path; predistorting at least one of the first digital signal and the second, digital signal in the digital domain according to at least one predistortion parameter; and adjusting the value of the first digital signal to switch an associated power amplifier from a linear mode of operation to a saturated mode of operation.

-Regarding independent claim 24, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: means for predistorting an digital input to mitigate nonlinear error associated with a power amplifier according to one or more predistortion parameters; means for converting the digital input from a normalized domain to a process, voltage, and temperature (PVT) dependent domain; and means for generating and analyzing an analog signal, based on the digital input, to determine appropriate predistortion parameters for the means for predistorting.

-Regarding independent claim 27, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier and a gain normalization component that transfers the digital input from a normalized domain to a domain that is dependent on process, voltage, and temperature (PVT) variations, and an estimator of step size of the power amplifier; and a signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal.

-Regarding independent claim 28, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an

amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier; and a signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal and an amount of spectral regrowth of the receiver path signal.

-Regarding independent claim 29, none of prior art of record teaches or suggests a method of calibrating a predistortion component in a transceiver system, comprising: providing a first digital signal, containing amplitude information related to a desired analog signal, to a transmitter path; providing a second digital signal, containing phase information related to the desired analog signal, to the transmitter path; predistorting at least one of the first digital signal and the second, digital signal in the digital domain according to at least one predistortion parameter; and generating and processing an analog signal based on the first digital signal and the second digital signal to determine values for the at least one predistortion parameter and estimate spectral regrowth of the analog signal.

-Regarding independent claim 31, none of prior art of record teaches or suggests an integrated transceiver circuit, comprising: a digital polar transmitter path that provides an amplitude/phase signal from a digital input, the transmitter path including at least one digital predistorter that predistorts the digital input to mitigate nonlinearities associated with a power amplifier; and a signal evaluator that determines values for at least one parameter associated with the digital predistorter based on the signal; and wherein the receiver portion of the integrated transceiver circuit comprises a sampling unit with feedback control for adjusting DC offset.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Phu whose telephone number is 571-272-3009. The examiner can normally be reached on M-F (8:00 AM - 4:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Phuong Phu
Primary Examiner
Art Unit 2611

/Phuong Phu/
Primary Examiner, Art Unit 2611